What is Claimed:

1. In an absorption cooling system of the type which uses a refrigerant and an absorbent and which includes a high stage generator, absorber, condenser, heat exchangers, and an evaporator and means for connecting said components to one another to form a closed absorption cooling system with said solution side of said high stage generator being fluidically divided into two sections with a partition plate whereby gas exiting one section at relatively high temperature is further cooled in the second section which functions as a flue gas recuperator (FGR) to improve overall burner efficiency.

2. The system of claim 1 in which the entire solution leaving the absorber is passed through the FGR.

3. The system of claim 1 in which a fraction of the solution leaving the absorber is passed through the FGR.

4. The system of claim 1 in which the stream of weak solution leaving H2 is split with a fraction of said solution being heated in the FGR.

5. The system of claim 1 in which part of the solution entering G2 is bypassed to the FGR.

6. In an absorption cooling system of the type which uses a refrigerant and a lithium bromide absorbent and which includes a high stage generator, absorber, condenser, high and low temperature heat exchangers, and an evaporator and means of connecting said components to one another to form a closed absorption cooling system with said solution side of said high stage generator being fluidically divided into at least two sections with at least one partition plate whereby gas exiting one section at relatively high temperature is further cooled in the second

section which functions as a flue gas recuperator (FGR) to improve overall burner efficiency.

7. The system in claim 1 in which the said FGR recovers about 20-40% of the waste heat available in the flue gas.

8. The system in claim 1 in which the said FGR recovers about 30% of waste heat available in the flue gas.

9. The system in claim 1 in which all of the weak solution that is circulated in the absorption cycle is passed through a FGR before entering in low temperature heat exchanger to exchange heat with exhaust gas leaving high stage generator section to eliminate the danger of crystallization of strong solution in the low temperature heat exchanger.

10. The system in claim 1 in which a fraction of weak solution that is circulated in the absorption cycle is passed through the FGR to exchange heat with exhaust gas leaving the high stage generator section.

11. The system of claim 10 in which solution leaving the FGR is mixed with heated weak solution leaving the high temperature heat exchanger.

12. The system of claim 11 in which the fraction of solution passing through the FGR is such that temperature of solution leaving FGR is +/-10 degree C when compared to temperature of heated weak solution leaving the high temperature exchanger.

13. The system of claim 10 in which solution leaving the FGR is mixed with heated weak solution leaving the low temperature heat exchanger.

14. The system of claim 13 in which the fraction of solution passing through the FGR is such that the temperature of solution leaving the FGR is +/-5 degree C when compared to temperature of heated weak solution leaving low temperature heat exchanger.

15. The system in claim 12 in which the fraction of solution flow entering the FGR is determined by use of an orifice.

16. The system in claim 12 in which the fraction of solution flow entering the FGR is determined by use of a mechanical valve.

17. The system in claim 12 in which the fraction of solution flow entering the FGR is determined by use of an electronically controlled valve.

18. The system in claim 14 in which the fraction of solution flow entering the FGR is determined by use of a mechanical valve.

19. The system in claim 14 in which the fraction of solution flow entering the FGR is determined by use of a mechanical valve.

20. The system in claim 14 in which the fraction of solution flow entering the FGR is determined by use of an electronically controlled valve.

21. In an absorption cooling system of the type which uses a refrigerant and an absorbent and which includes a high stage generator, absorber, condenser, high and low temperature heat exchangers, and an evaporator and means for connecting said components to one another to form a closed absorption cooling system with said solution side of said high stage generator being fluidically divided into two sections with a partition plate whereby gas exiting one section at relatively

high temperature is further cooled in the second section which functions as a flue gas recuperator (FGR) to improve overall burner efficiency.

22. The system in claim 21 in which a fraction of the stream of the weak solution leaving the low temperature heat exchanger is passed through the FGR to exchange heat with exhaust gas leaving the high stage generator section.

23. The system in claim 21 in which the fraction of solution passing through the FGR is such that the temperature of the solution leaving the FGR is +/-5 degree C when compared to the temperature of the heated weak solution leaving the high temperature heat exchanger.

24. The system in claim 21 in which a fraction of the solution entering the low stage generator is bypassed to exchange heat in the FGR to produce refrigerant vapor.

25. The system in claim 24 in which the fraction of the solution entering FGR is such that concentration of solution leaving FGR is equal to concentration of solution leaving low stage generator.

26. The system in claim 24 in which the fraction of solution entering the FGR is such that the absorbent concentration of solution leaving the FGR is within +/-0.5 percent absolute when compared to the absorbent concentration of solution leaving the low stage generator.

27. The system in claim 24 in which the vapor portion of the FGR and vapor portion of the low stage generator are fluidically connected to operate at a pressure difference not exceeding 0.2 torr.

28. The system in claim 21 in which weak solution entering the high temperature heat exchanger is heated with the FGR.

29. The system in claim 28 in which solution entering the FGR is the entire weak solution leaving the low temperature heat exchanger.

30. The system in claim 21 in which the said absorbent is lithium bromide and the said refrigerant is water.

31. The system in claim 21 in which said solution side of said high stage generator is fluidically divided into more than two sections with partition plates between each connecting section, whereby gas exiting one section at a relatively high temperature is further cooled in said subsequent sections (FGR) to improve overall burner efficiency.

32. The system in claim 21 in which the said two sections are connected to the said partition plate with a weld joint.

33. The system in claim 21 in which the said two sections are connected to the said partition plate with a removable flange connection.

34. The system in claim 21 in which the effectiveness of the said heat exchangers is between about 80% and 95%.

35. The system in claim 34 in which the preferred effectiveness of said heat exchangers at full load operating condition is about 85%.

36. The system in claim 34 in which preferred effectiveness of the said heat exchangers at full load operating condition is about 95%.